

# NASA SBIR/STTR Technologies

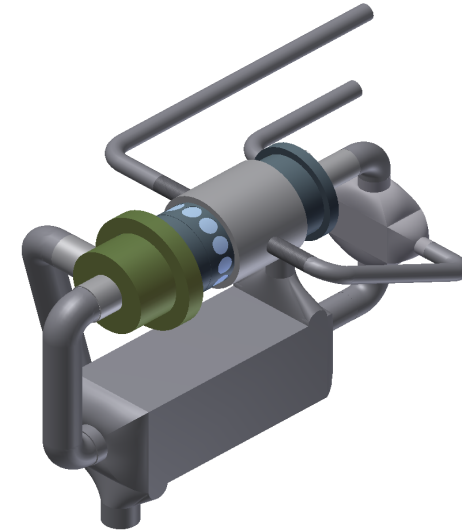
H8.03-9492 - Turbo-Brayton Power Converter for Spaceflight Applications



PI: Jeffrey Breedlove  
Creare, Inc. - Hanover, NH

## Identification and Significance of Innovation

Future NASA space missions require advanced thermal-to-electric power converters that are reliable, efficient, and lightweight. Creare proposes to develop a turbo-Brayton power converter with high efficiency and specific power for these applications. Gas bearings will provide reliable, maintenance-free, long-life operation. Discrete components can be packaged to fit optimally with other subsystems. Continuous gas flow can communicate directly with remote heat sources and heat rejection surfaces without ancillary heat transfer components and intermediate flow loops. Creare is well suited to succeed because we have a long history developing Brayton systems for challenging spaceflight applications.



Estimated TRL at beginning and end of contract: ( Begin: 2 End: 3 )

## Technical Objectives and Work Plan

Technical Objectives:

1. Optimize design trades
2. Develop preliminary design
3. Quantify thermodynamic performance
4. Determine mass and size
5. Demonstrate critical fabrication processes
6. Assess technical risks.

Work Plan:

1. Trade Studies
2. Component Design
3. Converter Assembly Design
4. Turbine Fabrication Trials
5. Management and Reporting

## NASA Applications

Power systems for space exploration probes, planetary surface stations and rovers, manned spacecraft and space stations, and nuclear electric propulsion. Heat sources include radioisotope decay, fission reactors, and concentrated solar radiation.

## Non-NASA Applications

Power systems for unmanned aerial vehicles, unmanned undersea vehicles, and mobile electric generators. Particularly attractive for mobile applications, environments with significant particulate contamination, and environments exposed to corrosive substances such as sea water. Heat sources include fossil fuel combustion, biofuel combustion, refuse burning, and concentrated solar energy.

## Firm Contacts

Jeffrey Breedlove  
Creare, Inc.  
P.O. Box 71  
Hanover, NH, 03755-3116  
PHONE: (603) 643-3800  
FAX: (603) 643-4657

**NON-PROPRIETARY DATA**